Schedule

Week 1 (09/07-9/11)

- Day 1
 - Introduction to Theory of Computation¹
 - Introduction to OCAML²
 - Assignment 1³
- Day 2
 - OCAML basics⁴
- Day 3
 - OCAML basics (cont)⁵
- Day 4
 - OCAML basics (cont)⁶
 - OCAML example: sets as lists (optional)⁷

Week 2 (09/14-09/18)

- Day 1
 - Alphabets, strings, substrings, empty string, lexicographic ordering⁸
 - Alphabet and friends in OCAML⁹
 - Assignment 2¹⁰
- Day 2
 - Languages, examples, constructions¹¹
- Day 3
 - Languages, examples, constructions¹²
- Day 4
 - Deterministic Finite Automata¹³

¹notes/theory_intro.html

²notes/ocaml_intro.html

³assignments/1.html

⁴notes/ocaml_basics.html

⁵notes/ocaml_basics.html

 $^{^6}$ notes/ocaml_basics.html

⁷notes/ocaml sets.html

⁸notes/alphabet.html

⁹notes/ocaml alphabet.html

¹⁰assignments/2.html

¹¹notes/languages.html

¹²notes/languages.html

¹³notes/fin_aut_dfa.html

Week 3 (09/21-09/25)

- Day 1
 - Deterministic Finite Automata (cont)¹⁴
- Day 2
 - DFAs in OCAML¹⁵
- Day 3
 - Regular Languages¹⁶
 - Union of regular languages is regular¹⁷
- Day 4
 - Implementation of union in OCAML¹⁸
 - Assignment 3¹⁹

Week 4 (09/28-10/02)

- Day 1
 - Non-deterministic automata, examples²⁰
 - Implementation in OCAML
- Day 2
 - DFA equivalent to an NFA²¹
- Day 3
 - Regular Expressions²²
 - RegEx -> NFA
- Day 4
 - Nonregular languages and the Pumping Lemma²³
 - Assignment 4²⁴
 - Catching up

¹⁴notes/fin_aut_dfa.html

¹⁵notes/ocaml dfa.html

¹⁶notes/fin_aut_dfa.html

¹⁷notes/fin_aut_dfa.html

¹⁸notes/ocaml_dfa.html

¹⁹assignments/3.html

²⁰notes/fin_aut_nfas.html

²¹notes/fin_aut_nfas.html

²²notes/regexp.html

²³notes/nonregular.html

²⁴assignments/4.html

Week 5 (10/05-10/09)

- Day 1
 - Lexers²⁵
- Day 2
 - Context Free Grammars²⁶
 - Examples of derivations
- Day 3
 - Midterm 1
- Day 4
 - Programming examples of CFGs
 - Ambiguous grammars

Week 6 (10/12-10/16)

- Day 1
 - Chomsky Normal Forms
- Day 2
 - PushDown Automata definition
- Day 3
 - PDAs more examples
 - OCAML implementation
- Day 4
 - CFG -> PDA
 - PDA -> CFG

Week 7 (10/19-10/23)

- Day 1
 - Fall Break
- Day 2
 - Non-context-free grammars
 - Pumping lemma for CFGs

²⁵notes/lexers.html

²⁶notes/cfg.html

- Day 3
 - Brief intro to parsers
 - More on parsers?
- Day 4
 - Turing Machines

Week 8 (10/26-10/30)

- Day 1
 - Turing Recognizable vs Turing Decidable languages
- Day 2
 - Multitape / Nondeterministic Turing machines
- Day 3
 - The Church-Turing thesis, algorithms
- Day 4
 - Decidable Problems, for regular languages

Week 9 (11/02-11/06)

- Day 1
 - **-** The Halting Problem
- Day 2
 - **–** Undecidability of Halting Problem
- Day 3
 - Catching up
- Day 4
 - Midterm 2

Week 10 (11/09-11/13)

- Day 1
 - Reducibility
- Day 2
 - Regularity of languages is undecidable
- Day 3
 - Time Complexity classes
- Day 4
 - The class P

Week 11 (11/16-11/20)

- Day 1
 - The class NP
- Day 2
 - P vs NP, NP-complete problems
- Day 3
- Day 4

Week 12 (11/23-11/27)

- Day 1
- Day 2
 - Thanksgiving Break
- Day 3
 - Thanksgiving Break
- Day 4
 - Thanksgiving Break

Week 13 (12/01-12/04)

- Day 1
- Day 2
- Day 3
- Day 4

Week 14 (12/07-12/11)

- Day 1
- Day 2
- Day 3
- Day 4